

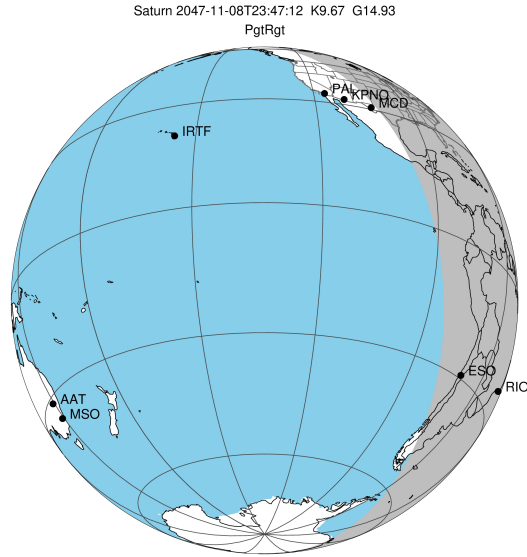
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-11-08T23:47:12.990
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Gaia source ID : 4069655068318952704
 2Mass ID (if available) : 18033614-2241278

Saturn 2047-11-08T23:47:12 K9.67 G14.93 PgtRgt

ICRS Star Coord at Epoch: 18h 03m 36.13760s -22:41:28.03065s

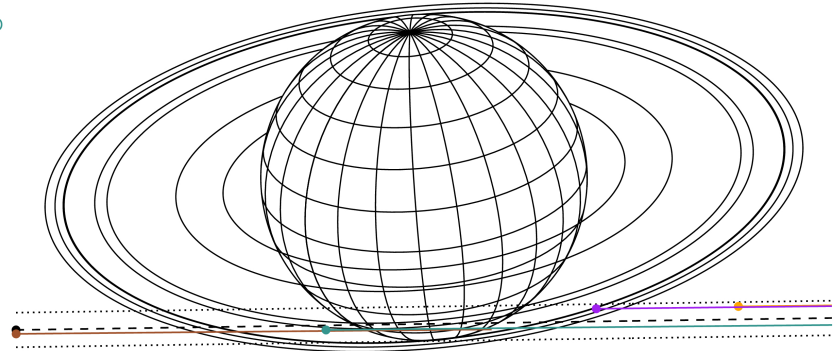
RUWE (>1.4 is poor) : 1.05
 K magnitude : 9.667
 G magnitude : 14.932
 RP magnitude : 13.660
 BP magnitude : 16.757
 DUPflag : 0
 Distance (au) : 10.721
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 30.65
 Sun-Target sep (deg) : 45.01
 Sun-Moon sep (deg) : 156.26
 B (ring opening deg) : 26.74
 PA of pole (deg) : 5.60

#	a(km)	ring
1	74490.6	C (IER)
2	91984.7	B (IER)
3	117571.2	B (OER)
4	122050.4	A (IER)
5	133423.3	Encke (IEG)
6	133744.9	Encke (OEG)
7	136774.4	A (OER)
8	140461.0	F ring



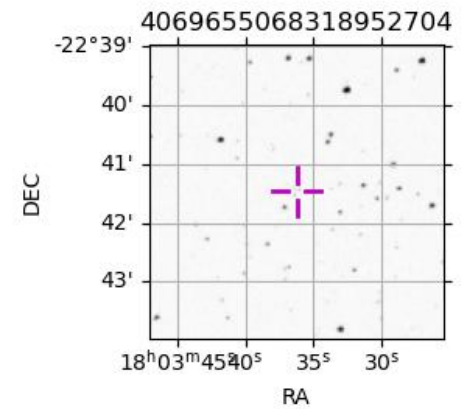
2047-11-08T23:47:12.9900 α: 18 03 36.1376 δ: -22 41 28.031 C/A 6.955° PA 0.84 deg v_sky +30.65 km/s D 10.72 AU
 Credit: Styled after SORA/Lucky Star

Earth
 KPNO
 MCD
 RIO
 ESO

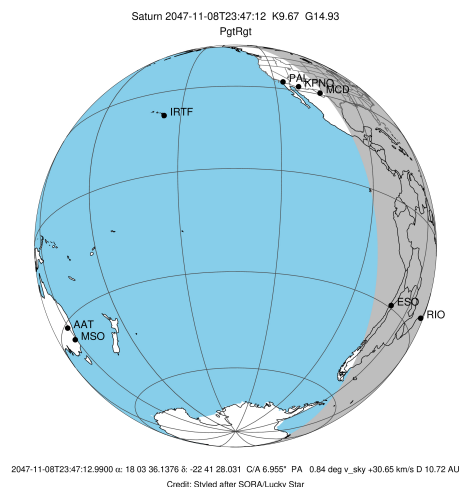


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

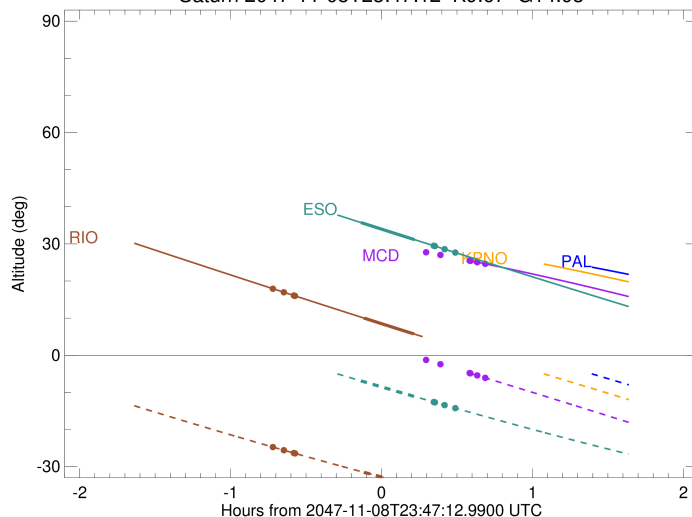
Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (20	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4					PnnRnn
MCD	McDonald Obs.	30.7	256.0			+	NOV 09 00:25 - NOV 09 00:28	PnnRne
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+	+		NOV 08 23:03 - NOV 09 00:00	PieRin
ESO	European South	-29.3	289.3		+	+	NOV 08 23:38 - NOV 09 00:16	PieRne
AAT	Siding Spring	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0					PnnRnn



target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-11-08T23:48:36.180
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : MCD
 Location : McDonald Obs. 2.7m
 Latitude (deg) : 30.67158
 E. Longitude (deg) : 255.97844
 Altitude (km) : 2.075
 Gaia source ID : 4069655068318952704
 2Mass ID (if available) : 18033614-2241278
 ICRS Star Coord at Epoch: 18h 03m 36.13760s -22:41:28.03065s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 9.667
 G magnitude : 14.932
 RP magnitude : 13.660
 BP magnitude : 16.757
 DUPflag : 0
 Distance (au) : 10.721
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 30.65
 Sun-Target sep (deg) : 45.01
 Sun-Moon sep (deg) : 156.05
 B (ring opening deg) : 26.74
 PA of pole (deg) : 5.60
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 6.332
 C/A sky separation (km) : 49232.4
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk

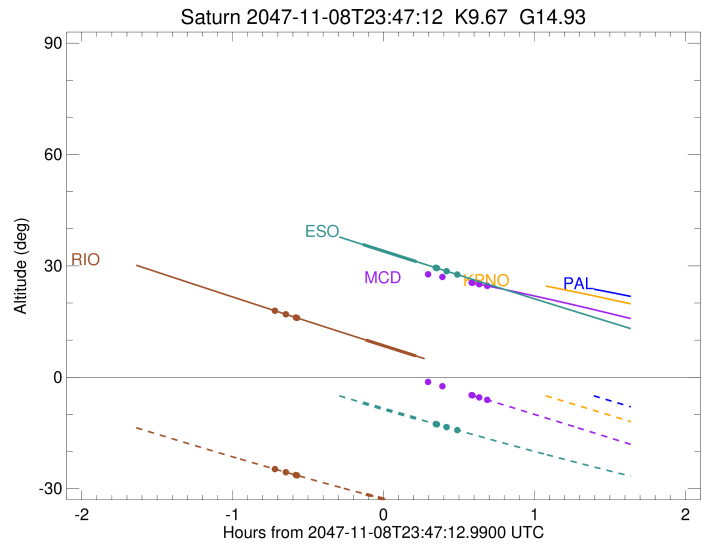
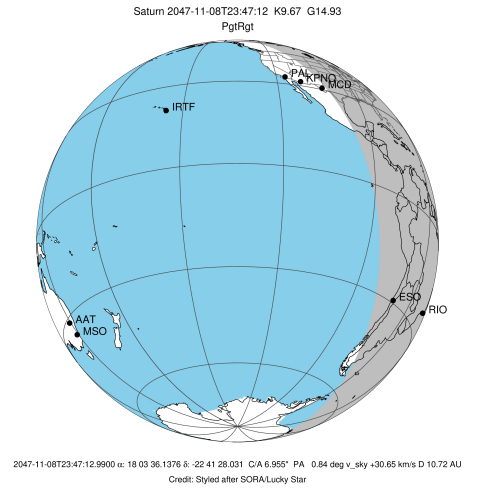


Saturn 2047-11-08T23:47:12 K9.67 G14.93



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-11-08T22:51:02.395		34.85	13.32x	140461.00	-19.65		
A (OER)	I	2047-11-08T22:54:13.763		34.64	12.71x	136774.40	-18.86		
Encke (OEG)	I	2047-11-08T22:56:57.472		34.45	12.20x	133744.89	-18.14		
Encke (IEG)	I	2047-11-08T22:57:15.242		34.43	12.14x	133423.31	-18.06		
A (IER)	I	2047-11-08T23:08:53.845		33.56	9.91x	122050.38	-14.34		
B (OER)	I	2047-11-08T23:14:31.311		33.09	8.82x	117571.16	-12.17		
Saturn	I	2047-11-08T23:30:09.349		31.65	5.75x	59570.44		-43.87	-49.45
Saturn	E	2047-11-09T00:06:51.538		27.50	-1.64x	59387.70		-51.29	-56.55
B (OER)	E	2047-11-09T00:04:59.193	b	27.73	-1.26x	117571.16	12.15		
A (IER)	E	2047-11-09T00:10:36.870		27.02	-2.41x	122050.38	14.34		
Encke (IEG)	E	2047-11-09T00:22:14.680		25.48	-4.80x	133423.31	18.10		
Encke (OEG)	E	2047-11-09T00:22:32.412		25.44	-4.86x	133744.89	18.18		
A (OER)	E	2047-11-09T00:25:15.730		25.07	-5.42	136774.40	18.91		
F ring	E	2047-11-09T00:28:26.561		24.63	-6.08	140461.00	19.71		

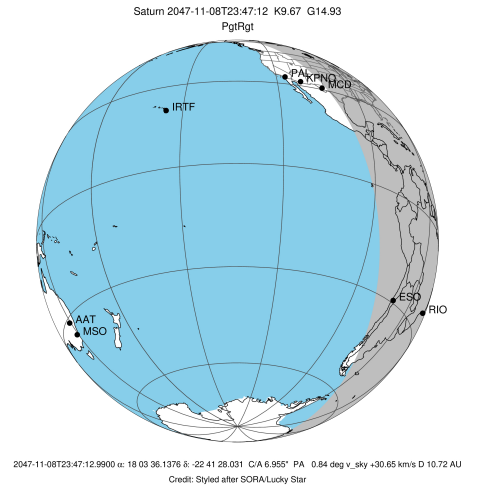
target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-11-08T23:50:15.550
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : RIO
 Location : Rio de Janeiro
 Latitude (deg) : -22.89506
 E. Longitude (deg) : 316.77708
 Altitude (km) : 0.033
 Gaia source ID : 4069655068318952704
 2Mass ID (if available) : 18033614-2241278
 ICRS Star Coord at Epoch: 18h 03m 36.13760s -22:41:28.03065s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 9.667
 G magnitude : 14.932
 RP magnitude : 13.660
 BP magnitude : 16.757
 DUPflag : 0
 Distance (au) : 10.721
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 30.65
 Sun-Target sep (deg) : 45.01
 Sun-Moon sep (deg) : 155.56
 B (ring opening deg) : 26.74
 PA of pole (deg) : 5.60
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.245
 C/A sky separation (km) : 56337.7
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



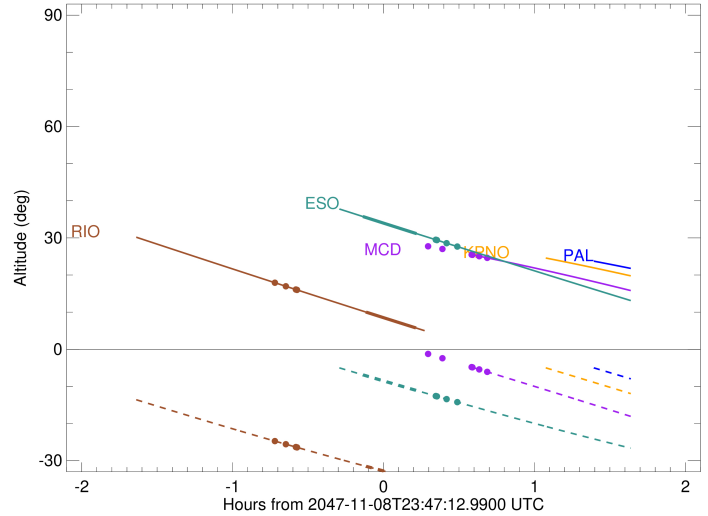
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-11-08T23:03:54.832		17.95	-24.71	140461.00	-14.83		
A (OER)	I	2047-11-08T23:08:15.899		17.00	-25.55	136774.40	-13.39		
Encke (OEG)	I	2047-11-08T23:12:14.569		16.12	-26.32	133744.89	-11.98		
Encke (IEG)	I	2047-11-08T23:12:41.605		16.02	-26.40	133423.31	-11.81		
Saturn	I	2047-11-08T23:40:12.061		10.03	-31.52	59295.90		-55.18	-60.15
Saturn	E	2047-11-09T00:00:06.058		5.75	-35.00	59176.73		-60.59	-65.03
Encke (IEG)	E	2047-11-09T00:07:05.889		4.25x	-36.17	133423.31	11.82		
Encke (OEG)	E	2047-11-09T00:07:32.902		4.16x	-36.25	133744.89	11.99		
A (OER)	E	2047-11-09T00:11:31.244		3.31x	-36.90	136774.40	13.42		
F ring	E	2047-11-09T00:15:51.701		2.39x	-37.60	140461.00	14.87		

target : Saturn
 target radius (km) : 60268.00
 C/A epoch : 2047-11-08T23:49:47.540
 Event type : PgtRgt
 : Saturn occs: geocentric, topocentric
 : Ring occs: geocentric, topocentric
 Observer code : ESO
 Location : European Southern Obs. (3.6m)
 Latitude (deg) : -29.26097
 E. Longitude (deg) : 289.26831
 Altitude (km) : 2.400
 Gaia source ID : 4069655068318952704
 2Mass ID (if available) : 18033614-2241278
 ICRS Star Coord at Epoch: 18h 03m 36.13760s -22:41:28.03065s
 RUWE (>1.4 is poor) : 1.05
 K magnitude : 9.667
 G magnitude : 14.932
 RP magnitude : 13.660
 BP magnitude : 16.757
 DUPflag : 0
 Distance (au) : 10.721
 f0 (km) : 0.000
 g0 (km) : 0.000
 skyplane vel. (km/s) : 30.65
 Sun-Target sep (deg) : 45.01
 Sun-Moon sep (deg) : 155.83
 B (ring opening deg) : 26.74
 PA of pole (deg) : 5.60
 Pole direction: RA (deg): 40.60000
 Dec (deg): 83.50000
 C/A sky separation (") : 7.193
 C/A sky separation (km) : 55929.9
 NAIF SPICE kernels : RAJobs_U111+rgf15.spk
 URKALLvl.spk
 Saturn_ring_plane.tf
 sat378.bsp
 sat286.bsp
 vgr1.sat286.bsp
 vgr2.sat286.bsp
 HST1081HSPephemUTC.bsp
 pfb10000r.bsp
 cassini.bsp
 earthstns_itrf93_040916.bsp
 earth_200101_990628_predict.bpc
 earth_720101_070426.bpc
 cpck28Mar2008.tpc
 pck.sat440.tpc
 IAU_SATURN_for_RINGFIT.tpc
 naif0012.tls
 earth_flat_IAU.spk



Saturn 2047-11-08T23:47:12 K9.67 G14.93



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-11-08T23:02:31.831		43.70	0.54x	140461.00	-15.09		
A (OER)	I	2047-11-08T23:06:47.624		42.77	-0.34x	136774.40	-13.72		
Encke (OEG)	I	2047-11-08T23:10:39.727		41.92	-1.14x	133744.89	-12.37		
Encke (IEG)	I	2047-11-08T23:11:05.883		41.83	-1.23x	133423.31	-12.22		
Saturn	I	2047-11-08T23:38:59.308		35.76	-6.88	59313.58		-54.41	-59.45
Saturn	E	2047-11-09T00:00:22.922		31.14	-11.11	59188.43		-60.03	-64.53
Encke (IEG)	E	2047-11-09T00:08:00.176		29.50	-12.60	133423.31	12.23		
Encke (OEG)	E	2047-11-09T00:08:26.310		29.41	-12.68	133744.89	12.38		
A (OER)	E	2047-11-09T00:12:18.121		28.58	-13.43	136774.40	13.74		
F ring	E	2047-11-09T00:16:33.363		27.67	-14.24	140461.00	15.13		